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ABSTRACT

The purpose of this study was to investigate the relationships between three tests which measured specific components of fencing skill and foil fencing success as determined by criterion measures derived from a round-robin tournament. The subjects were 59 women enrolled in four beginning fencing classes taught by the same instructor at the University of Iowa. The data collected included performance on a test of combined reaction-movement time, similar to the parry; a wall target test of accuracy of the thrust with the foil; and a test of speed of the advance-retreat movement. Measures of the fencing success of each subject were obtained from class round-robin tournament results, and two criterion measures were computed. The first measure was based on the touches the fencer made against opponents; the second on both the touches made against opponents and touches scored on the fencer. Results indicated (1) that speed of the combined reaction-movement time variable had significant negative relationships with the two criterion measures of fencing success, (2) that the two criterion measures were significantly related to each other, and (3) that the wall target accuracy variable had a significant relationship with criterion 1. (Author/BD)

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RELATIONSHIPS BETWEEN COMPONENTS OF SPEED, ACCURACY, AND FENCING SUCCESS.

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Foil fencing is a sport which requires quick and accurate body movements. The objective of the fencer is to touch the legal target area of his opponent, and to deflect any attacks to his own target area. Both the offensive and the defensive movements of the fencer need to be quick and accurate. One might assume that the fencer who is quickest and most accurate will be the most successful fencer, but there is no evidence that this is necessarily true.

In many sports it is not possible to isolate specific movement factors and subject them to laboratory testing, but with fencing it should be possible to design controlled laboratory tests which attempt to measure those movement factors thought to be most involved with excellence in the sport. However, very little research has been completed with fencing.

Pierson (2) compared fencers and non-fencers on eight psychomotor measures and six anthropometric measures, and found that fencers were significantly faster than non-fencers in those measures which involve movement of the arm.

Mastropaola (1) did a laboratory study of fencing movements including the advance, retreat, lunge, recovery from the lunge, advance-lunge, retreat-lunge, and the fleche. In addition to many other measurements, he analyzed the time necessary to perform each of the above movements from variations on the classical on-guard position.

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Singer (3) studied the relationships between reaction time, response time, movement accuracy, and two criterion measures of fencing success of college women enrolled in beginning fencing. He found that the criterion measures, derived from tournament matches, correlated little better than zero with reaction time, response time, and movement accuracy.

Singer tested subjects on a special apparatus designed to obtain a measure of reaction time, response time, and accuracy on a single trial. The investigator felt that perhaps the low correlations were due to the combined measurement of speed and accuracy. Perhaps it is mainly the accuracy of the thrust which is more important than the speed. In addition, the speed factor might be more important in the defensive parry movement.

The purpose of this study was to investigate the relationships between a combined reaction-movement time test similar to the parry, accuracy of the thrust with a foil, speed of the advance-retreat movement, and foil fencing success as determined by criterion measures derived from a round-robin tournament.

Procedure

Fifty-nine female college students enrolled in four beginning fencing classes, all taught by the same instructor,

were used as subjects in this study. All subjects received six weeks of instruction before testing began.

A Dekan Timer was used to test reaction-movement time. The subject stood in the on-guard position in a corner of the testing room, holding an impact switch, attached to the timer, in her foil hand. The impact switch was touching a small tape mark on the wall the subject had her foil arm toward, and directly above the tape mark was a small signal light, also attached to the timer. The investigator activated the timer, and after a randomized interval of time the signal light flashed on, at which time the subject quickly moved her arm to the left (if she was a right-handed fencer), hitting the other wall with the impact switch and stopping the timer. After each trial the investigator re-set the timer and altered the time interval control so that the time period between the activation of the timer and the flash of the signal light would not be standard. Five trials were given to each subject, and the scores for the five trials were summed.

For the speed of the advanced-retreat movement the subject was placed in the on-guard position with her forward foot behind the starting line. On a signal from the investigator, she advanced as rapidly as possible until any part of her forward foot touched a second line six feet from the starting line. She then retreated to the starting line, and advanced to the second line two more times. The third time

her forward foot touches the second line, she was instructed to retreat completely past the starting line, and the stopwatch was stopped when she was completely past the starting line.

To measure accuracy a target with six three-quarter inch concentric circles was made by the investigator and attached to the wall at a height of 50 inches. The subject was allowed to find her thrusting distance with a foil, and then on a signal was allowed ten trials, with a possible score of 100.

All subjects fenced in a round-robin tournament within their own class, and the two criterion measures of fencing success were derived from tournament results in the same manner as that used by Singer (3).

Criterion I $10 \frac{\text{total touches fencer made against opponents}}{\text{number of bouts fenced}}$

Criterion II $100 \frac{\text{total touches fencer made against opponents}}{\text{total touches opponents made against fencer}}$

Results

The split halves reliability for the wall target accuracy test was 0.35, and the reliability for the reaction-movement time test was 0.69.

The sums of each subject's trials for the reaction-movement time test and the wall target accuracy test were used as the final score for each of those tests. The score for the advance-retreat test was the total time, recorded

to tenths of a second, which elapsed from the beginning to the end of the test.

Intercorrelations of the five variables are presented in Table I. The highest significant correlation was between the two criterion measures of fencing success. Criterion I, which was based on the touches the fencer made against opponents, had a significant negative relationship with the reaction-movement time variable. Criterion II, based on both the touches made against opponents, and touches scored on the fencer, had a significant negative relationship with the reaction-movement time variable. Criterion I had a significant positive relationship with the wall target accuracy variable. None of the other correlations was significant at the five percent level.

Discussion

The significant correlation between the two criterion measures of fencing success was to be expected since both criteria utilized the number of touches the fencer made against her opponents.

Since the reaction-movement time variable was designed to measure a movement similar to the parry one might expect that it would have a higher relationship with criterion II than criterion I, since criterion II was partly based on touches made against the fencer. Although both criterion

TABLE I

Intercorrelations between
all Variables

Variables	Ad.-rt	Acc.	R-m	Cr.I	Cr.II	X	sd
Advance-retreat		-.14	.22	.00	.00	8.09	1.33
Accuracy			.00	.26[a]	.14	82.49	26.75
Reaction-movement time				-.33	-.28[a]	.185	.171
Criterion I					.74[b]	28.17	7.92
Criterion II						117.33	76.31

[a]significant at .05 level

[b]significant at .01 level

measures had significant negative correlations with the reaction-movement time variable, the correlation between criterion I and reaction-movement time was higher than the correlation between criterion II and reaction-movement time. The higher correlation between criterion I and reaction-movement time might be accounted for if a substantial number of the touches scored against opponents were scored on a parry riposte. In a parry riposte the fencer parries her opponent's attack and immediately extends her foil and attacks her opponent.

The significant correlation between the wall target accuracy test and criterion I seems to indicate that accuracy with the foil is, within the limits of this study, related to a measure of foil fencing success.

The lack of any significant correlations between the speed of advance-retreat test and any of the other variables may be due to inadequate measurement of the advance-retreat skill, or perhaps it is not the speed but rather the strategic use of the advance or retreat which is most crucial to fencing success.

Conclusions

Within the limitations of this study the following conclusions were made:

1. The ability to score touches against an opponent is related to the ability to prevent an opponent from scoring

touches against oneself.

2. The ability of a fencer to prevent an opponent from scoring touches against her is related to a measure of speed of reaction and movement time of the foil arm.

3. The ability to score touches against an opponent is related to a measure of speed of reaction and movement time of the foil arm.

4. The ability to score touches against an opponent is related to a measure of wall target accuracy with the foil.

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